A Proximity Indicator for e-Government: The Smallest Number of Clicks

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Abstract

In order to develop an indicator measuring the proximity of e-Government and its different generic functions, we analysed a set of studies that were conducted in the United States and in Europe. We defined 21 elements of measure grouped in six dimensions of proximity and we surveyed the official Websites of the French-speaking Swiss Cantons in 2002 and 2003. We observed that more technical aspects such as navigability were well developed, whereas more "socio-political" aspects (data protection, access for handicapped) and organisational issues were still in early stages. To conclude this work we give some hints for the application of a methodology based on proximity measurement.

Keywords e-Government, portals, evaluation, proximity, 3-clicks rule, usability

Introduction

In the past years many surveys were made in order to measure the development of e-Governement. Most of them assessed the efficiency of e-Government portals in terms of existing features, i.e. presence of designated information (Ingram & Gray, 1998; Rockville, 1999; Andersen Consulting, 2002; West, 2002; Etude EVS Conseil, 2001; Cap Gemini-Ernst & Young, 2002; Finger & Cotti, 2002). On the other hand, Web designers and usability experts (Blackmon, Polson, Kitajima & Lewis, 2002; Kalbach, 2002; Ritter, 2002; Zeldman, 2001) insist on the importance of the availability of the information within a few clicks. Indeed they use the number of clicks as a measurement value or even as an accessibility norm and authors such as Huberman, Pirolli, Pitkow, & Lukose (1998) or Milic-Frayling, Jones, Rodden, Smyth, Blackwell et al. (2004) conduced empirical surveys on Web navigation using the click as a measurement value. However it was not very clear to us where this concept of number of clicks came from and how it became this sort of de facto measurement standard. Therefore we decided to study this approach and to identify its strengths and limits. We then developed a new indicator and applied it to the

portals of the French-speaking Swiss Cantons[1] in order to validate it empirically. The goal of this work was not to provide a new method to assess and rank e-Government portals, it was rather to go beyond simple metrics and to establish synthetic profiles for selected public sector Websites and to analyse their evolution.

Assessing the Usability of e-Government portals

Public administrations largely recognised the potential of Information and Communication Technology and many of them launched reorganisation projects in order to take full advantage of technology. Although a survey of these reorganisation and modernisation projects and their impacts is out of the scope of this paper, we believe it is useful to point out two critical dimensions that these e-Government initiatives face.

Public administrations are vast and complex organisations and they are usually very heterogeneous in terms of competencies and operational modes. Moreover they often have to take into account previous strategic IT choices and legacy systems. Thus we think that the first critical dimension for the development of e-Government is **integration**, as pointed out by several authors (Klischewski, 2004; Reddick, 2004; Traunmüller & Wimmer, 2004). The public sector indeed has to rethink and reorganise its business processes and operational practices in order to provide integrated electronic services through e-Government portals. In some cases solutions are technical (i.e. integration of middleware), in others integration is realized with meta-languages[2] and in few cases everything is to be rebuilt from scratch. However such integration projects cannot be considered successful if the end user does not have a **simple and single access** to all electronic public services (Dawes, Pardo & Cresswell, 2004), and that is the second critical dimension we mentioned. Integrated services are delivered through "one-stop government portals" that provide a direct and homogeneous link between public services and their users: citizens, businesses, organisations, etc.

This ideal of a "natural" interface between varied final users and heterogeneous public services seems only logical, but it is a complex task to realise in order to offer universal and equal access to all. Furthermore this interface must be convivial, usable and readable[3]. Since the early days of Internet, many scientific disciplines (cognitive sciences, psychology, sociology, ergonomics, etc.) studied the problems related to universal and easy access. This research and analysis domain is part of the Human Computer Interaction[4] field and is commonly called "usability". In parallel of these scientific approaches, others made their own personal experiences and shared their empirical knowledge with the Internet community (Nielsen, 2000; Zeldman, 2001). That is how rules and recommendations emerged from the community of Web designers and users, such as the Netiquette or various "rules of thumbs" for building Websites. One of the leading experts on Web design and usability is Jacob Nielsen[5] and his work is typically based on his own experiences and on such "common rules", "guidelines" or "tips". Amongst all these useful pieces

[1] A Canton is one of the 23 States that compose the Swiss Confederation.
[2] For an example of middleware integration and meta-language development, see the European IST project e-Gov (Glassey, 2004).
[3] Definitions of readability are given in (Flesh, 1951).
[4] For explanations on Human Computer Interaction, see (Dix, Finlay, Abwod, & Beale, 1998).
[5] He wrote many papers and books on the topic; see for example (Nielsen, 2000): one section gives guidelines for link titles, another explains how a site should be structured, etc.

of advice, the 3-clicks rule is almost a leitmotiv: all content of a site must be accessible in three clicks. Before we go any further with this rule, let us briefly study the concept of click and its implications in the context of Internet.

What is a click?

At the most trivial level, a click is the noise produced when a user presses on a button of his mouse. By extension this term is applied to a basic interaction that a user has with a computer system. In the world of Internet the click has an additional meaning: it is the action of activating or using a hyperlink. This is the most basic level of definition and contextual semantic levels were gradually added, transforming the click in a form of universal metrics and placing it at the centre of the World Wide Web development. It is notably considered as an indicator of traffic on Websites, used to measure their popularity and economic value. As such, the click became the unit of measure for online marketing[6]. Furthermore it became a distance measure: it shows how many steps users have to follow to "surf" from one point to another (Huberman & al., 1998; Milic-Frayling & al., 2004). This notion is used in electronic commerce, as the number of clicks required for the completion of a transaction must be minimized in order not to loose potential buyers. It even became a marketing argument: the slogan of the French railway company's Website is "in three clicks you've made your reservation[7]". Others use it as a guaranty of quality: like the pizza delivery shops that give away their pizza if it takes longer than 30 minutes to get to the customer's home, some companies provide compensations if the buyer needs more than 3 clicks to acquire one of their products[8]. The concept of click is even used by charities as a mean of raising money (Brozek, 2001). This logic came to an extreme with the famous US patent 5.960.411 that granted Amazon.com the rights on the "1-Click Check-out System" and provoked a vast protest amongst Internet users and Amazon competitors, which could not accept this appropriation of a basic WWW functionality by a private company[9].

The 3-clicks Rule

Beyond the click as functionality, the numbers of clicks and specifically the 3-clicks rule are seen as a global way of designing and organising Websites. "Your visitors should be able to find what they are looking for in your site within three clicks[10]". This quote is rather typical: it integrates the 3-clicks rule but remains very vague on the function of this rule. Indeed it does not give any hint on what "the visitors are looking for", or in other terms, what is the result of applying this rule? We studied this topic by several authors (Bernard, 2002; Kalbach, 2002; Porter, 2003; Zaphiris & Mtei, 1997; Zeldman, 2001) and we found that no systematic identification of the desired results existed and that furthermore they varied from one author to another. However we distinguished several common ideas. The first goal of the 3-clicks rule seems to be the conformity of a Website and of users' expectations, whether explicit or implicit. "A visitor looking for information is unlikely to follow 4 clicks to get to the information they want. If not, they are very likely to click off your site as quickly as they clicked on[11]". In other words, the 3-

[6] This online marketing dictionary proposes several economic values based on the concept of click (http://www.marketingterms.com).
[7] http://www.filsdepub.com/tmss/sncf07.html
[8] http://www.becomeglobal.com/quienes-somos/3clicks-e.htm
[9] http://www.gnu.org/philosophy/amazon.html
[10] http://www.grantasticdesigns.com/5rules.html
[11] http://www.cyberwebglobal.com/web_site_design_rules.htm

clicks rule defines a tolerance threshold in supposed surfing habits of Internet users. As a consequence it becomes both a "good-practice" for Web designers, enabling them to structure their sites in accordance to the expectations of the users, and "guidance" for users who will visit a new Website with the knowledge that they should find whatever they are looking for in less than 3 clicks. Some even have a rather absolute interpretation of this rule: "Your site should be designed so that a user is never more than three clicks from their desired end result. Read that last sentence carefully - the emphasis is on what the user wants, not on how you want to lead her/him around by the nose[12]". However some are in favour of a more flexible interpretation and believe that the number of clicks is not so important as long as the user has the feeling he is going in the right direction[13]. They argue that the quality of the navigation milestones is as important as the number of steps to follow. For our part we think that the 3-clicks rule, whether it is strictly respected or not, has consequences on Websites architecture that becomes either broader or deeper. The concepts of depth and breadth in Websites are explained in (Zaphiris & Mtei, 1997) and the pros and cons of depth vs. breadth are discussed in (Bernard, 2002; Jacko & Slavndy, 1996; Zaphiris, 2001). Porter (2003) goes further in the discussion and asserts that this rule can misdirect its users although he writes that "the Three-Click Rule isn't completely bad". He found that some users visited as many as 25 pages before ending their tasks and that other only visited two or three before stopping. Furthermore Porter showed that there was not any more likelihood of a user quitting after three clicks than after 12. On our side we believe it could prevent any innovative or "avant-gardist" conceptions if its application is totally strict, because designers could fear that users might not like or even not understand new structural conceptions.

Whatever one's opinion on the 3-clicks rule is, one can only observe that it is largely in use and very likely to stay so for a while. But where does it come from? We looked at authors such as (Kalbach, 2002; Porter, 2003; Zaphiris & Mtei, 1997; Zeldman, 2001) and we could not find a definitive answer. Most authors think it derives from the researches of G.A. Miller in experimental psychology. Yet Miller never mentions the number 3 in his most cited publication, "The magical number seven, plus or minus two: some limits on our capacity to process information" (Miller, 1956). Furthermore he was working on short-term memory and the ability to recall numbers[14], which does not have much to do with the topic we are debating here. We are not talking about remembering numbers but about a maximal number of steps that users accept to follow before reaching their goal. Thus this "golden number" seems to have no scientific validation and is more likely a practical formula that covers several levels of complexity. Kalbach (2002) even calls this the Myth of "Seven, Plus or Minus 2". The simplicity of this rule is probably at the origin of its success and, scientific background or not, it is now more or less a standard in Web design. Its validation does not come from its intrinsic qualities but from its popularity: the 3-clicks rule is legitimate because users and designers internalised[15] it and respect it.

In regard of what we discussed above, one could ask whether it is legitimate to make a study based on the concept of number of clicks. If this "norm" is an ex-abrupto construction, does it

[12] http://www.iboost.com/build/design/articles/1081.htm
[13] http://www.website-owner.com/articles/design/3clickrule.html and http://www.maadmob.net/donna/blog/archive/000020.html
[14] His empirical work showed that human beings could retain 7 ± 2 numbers in their short-term memory.
[15] For an example of "internalisation", see http://www.askjewels.com/mttest/archives/000032.html

make sense to make an empirical analysis based on it? We do not think we can use it as is, because we believe that counting the numbers of clicks is not a sufficient indicator in order to measure the accessibility or the usability of a Website. However we judge that it can be a useful factor in order to evaluate user experience, as we have seen that many Web designers and users internalised this norm. With these considerations in mind, we decided to find out if the 3-clicks rule has an influence on e-Government portals, in terms of depth and breadth, and to verify empirically if one can find what he is looking for within three clicks on administrative Websites.

Methodology

We made two sets of measures on six official portals of French-speaking Swiss Cantons in 2002 and 2003. These measures were both made within a timeframe of one week with an on-line questionnaire that we completed while surfing on these portals. Our goal was to study which elements were available in order to support interactions between citizens and these public administrations. We selected the elements to survey on the basis of several existing studies, in the United States (Ingram & Gray, 1998; Rockville, 1999; Andersen Consulting, 2002; West, 2002) and in Europe (Etude EVS Conseil, 2001; étude Kosmos, 2000; Cap Gemini-Ernst & Young, 2002; Finger & Cotti, 2002; Chappelet & Hitz, 1999). We listed all the elements that these surveys used and we chose to keep only a total of 15 common elements.

Our first observation was that these studies were based on very heterogeneous approaches, but the elements of measure were often quite similar. We also discovered that most of these studies only took into account the existence or non-existence of relevant elements. Schematically, the evaluations we analysed gave grades to the surveyed Websites according to the availability of elements that were seen as a guaranty of quality[16]. These studies all used many quantitative variables and some of them included subjective elements such as "quality of the graphical chart" in order to measure users perception. Using this type of approaches, one can evaluate quickly a large number of Websites in order to obtain a global "image" at a given moment. However we think this binary approach is limited because it does not show the inherent strengths or weaknesses of a portal: it can integrate all the functionalities measured in a study and still be not very usable. In order to go a little bit further than these approaches we propose to transform the binary value of the existence of a given element (which we think amounts to an absolute value) into a relative one. In other terms, we believe that the value given to the existence of functionality on a Website should be dependent of its accessibility. Thus we used the concept of number of clicks to measure the distance between selected functionalities and the homepage. For example we think that the relevancy of publishing an email address on a Website is dependent of its distance (in number of clicks) from the entry point of a portal. Thus the idea of a proximity indicator based on the smallest number of clicks.

However the 3-clicks rule limitations mentioned above made us decide not to incorporate it as is. Furthermore Porter (2003) writes that it is not until 15 clicks that 80% of the users complete a given task and Millic-Frayling & al. (2004) found that 27.7% of all clicks were back button clicks. According to surveys listed in (Blackmon & al., 2002), the mean successful click-rate[17] is 1.38 on a Web page with 16 links, 1.77 for a page with 32 links and 2.67 for a page with 51 links.

[16] For an illustration of these types of approaches, see (Kerschot & Poté, 2002).

[17] The ideal situation would be to have a mean click rate of 1, meaning that the first link clicked would always be the correct one.

Huberman & al. (1998) made several surveys with different results: 23'692 AOL users made an average of 2.98 clicks on each site they visited (more that a million in total) on December 5, 1997. On the other hand 107 users from the Georgia Institute of Technology that were monitored during three weeks had a mean of 8.32 clicks across all visits to each site for the duration of the study. All these findings convinced us that it was not possible to measure the proximity of e-Government on the basis of an absolute number of clicks, that is why we decided to calculate how "deep" in a site a user had to go in order to find what he was looking for. As we made no hypothesis on preferences and surfing habits of users, we always tried to use different search strategies and systematically recorder the smallest number of clicks: clicking of thematic hyperlinks, using search engines or sitemaps, using visual or textual modes of navigation, following the formal organisational structure of the portal, etc. In our survey two clicks away from the homepage does not mean that a given user only clicked two times, it means that the shortest way to get there from the homepage is two clicks. We adapted the "So-called Rule of Five[18]" (Zeldman, 2001) and considered that 5 clicks was the maximal depth a user would go and still have the impression of going in the right direction, that is being in "proximity" of e-Government services. Therefore we considered that having to click more than five times was equivalent to not finding the information and inversely we decided that non-existing information was equivalent to a count of five clicks.

As explained in the beginning of this section, we adapted 15 elements of measures from existing surveys. We also added six general administrative procedures in order to measure how interactive these sites were. Two of these procedures belong directly to the field of responsibility of the Cantons, two are mainly in the field of responsibility of local authorities and the last two belong to the Federal government. We integrated these different levels in our study because in our view the concept of "proximity" in e-Government also implies transparency for the end-users: they do not have to know which authority is responsible for which procedure when they look for information on the Internet. Table 1 shows the 21 elements we were looking for on the public portals we analysed. These elements of measure were really concrete, but for the general presentation of the results or for comparisons, we grouped them in generic functions that should be integrated in an interface between a public administration and its users. We defined these abstract proximity dimensions empirically, on the basis of the elements of measure we identified and according to our various experiences in the field of usability and e-Government.

Table 1 Dimensions and Variables of the Smallest Numbers of Clicks

Proximity Dimensions	Brief Definition	Elements of measure
Connectivity	SNC to find means of communicating directly with public administrations.	– *Phone/Fax/Postal Address* – *E-mail*
Actuality	SNC to reach elements showing the temporal relevance of information or services or to access up-to-date information.	– *Last update* – *Newsletter* – *"Push" services*
Navigability	SNC to find help and support or to reach navigation tools.	– *Index* – *Search engine* – *Help* – *FAQ* – *Return to homepage*

[18] "Complex, multi-layered menus offering more that five main choices tend to confuse Web users".

Accessibility	SNC to find elements guarantying that the portal is open to varied users.	– *Navigation for handicapped* – *Translations*
Transparency	SNC to find elements that help understanding administrative services and to give feedback regarding these services.	– *Survey* – *Data protection* – *Official publications*
Interactivity	SNC to find elements allowing the users to undertake administrative procedures.	– *Marriage* – *New business creation* – *Working permit application* – *Working permit renewal* – *Building permit application (Project representative)* – *Building permit application (Client)*

In order to validate this proximity indicator we conducted two online surveys at a time interval of 18 months in 2002 and 2003, with the idea of measuring the evolution of six Swiss Cantonal Portals.

Results

This survey allowed us to define 6-dimensional profiles of the French-speaking Swiss Cantons. To show these results graphically we used a "compass" inspired by the work of Kolence and Kiviat (1973). It shows the average SNC as an area indicating the average distance between 0 and 5: a smaller area shows that a Website is more compact and that the proximity is "better". Detailed results are available in Glassey & Glassey (2003), but here we will only illustrate our approach with selected examples. Figure 1 shows the global evolution of the cantonal portals between 2002 and 2003: the numbers of clicks to reach all 6 proximity dimensions diminished, meaning that these portals became "flatter".

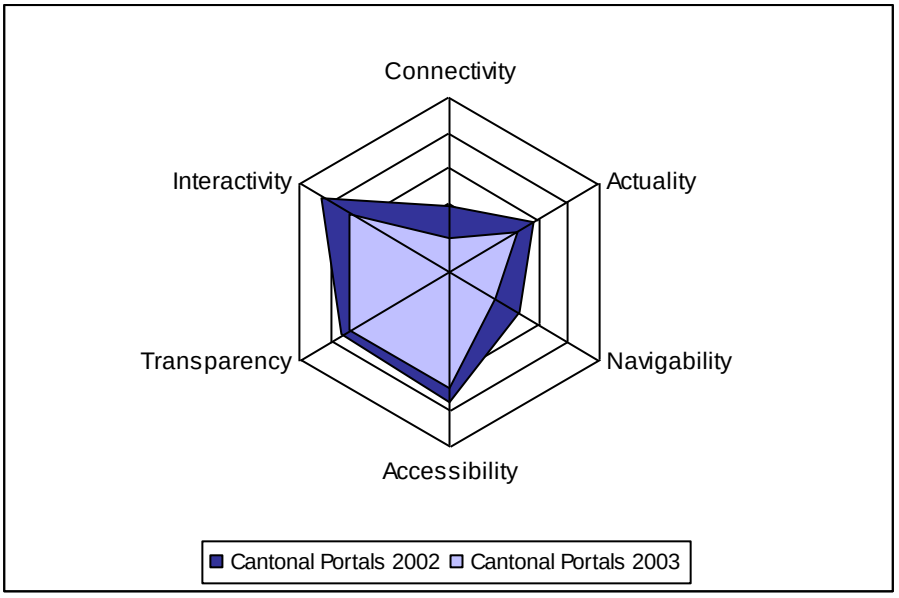

Figure 1. Average e-Government Proximity of Cantonal Portals in 2002 and 2003

We will not present the results of each individual Canton; we rather want to point out a few key points of what we found out during our study. For most Cantons, the problems of **accessibility** are not taken into account, notably regarding special interfaces for handicapped people. Contrary to the Anglo-Saxon practice, there is no mean of pressure to accelerate the development of such systems. In the United States for example, public administrations must make their Websites accessible for people who have vision, audition or motion deficiencies in accordance to Section 508 of the Rehabilitation Act Amendment of 2001. In a similar way, foreigners are not taken into account if they do not master the French language, although they are not a negligible part of the population in terms of interactions with public administrations. Furthermore we noticed that, when translations exist, there are large differences in the contents offered, as translations are not updated at the same time (or at all).

We were also rather surprised to note that most public portals provide no information regarding data and personal sphere protection, although it is a very hot topic in Europe. Thus citizens do not know what will happen with data they provide online, even if one can consider that most citizens would trust their public administrations not to sell that kind of data, for example for marketing purposes. In some cases, we found warnings stating that emails sent to public administrations were not secure, but we did not considered it was sufficient. Moreover we considered that **transparency** was not only a matter of protection personal data, but that citizens should also be able to give their opinions on these public portals. We did not find any means of providing feedback regarding online services or information, other that a general email address, which purpose was not clearly stated.

Finally we found only basic information on on-line administrative procedures, for example how and where to realize these procedures, sometimes in terms of life-events (marriage, birth, and so on). The most advanced ones provide electronic forms, but it is rarely possible to do any on-line transactions. Often these forms have to be printed and sent by postal mail. Basically we can only state that **interactivity** is far from being realized on the portals of the Cantons we surveyed.

On the other hand, the cantonal portals do well regarding the dimensions of **connectivity**, **navigability** and **actuality** and they got better along these axes between 2002 and 2003. Moreover, we found out that half of the Cantons had a very similar convergence for these three dimensions: even if they had contrasted situations in 2002 and 2003, the evolution was really parallel. This makes us think that we might see a sort of collective learning in the domain of e-Government. We did not study that further on, but it could mean that a form of consensus is appearing in the structure and the organisation of public sector Websites. The fact that Cantons made similar ameliorations along the same axes could also be related to the normalization or internalisation of the 3-clicks rules that we mentioned in Section 4.

Lessons learned

When analysing the results for each Canton we realised that they had different profiles (see Figure 2 and 3 for examples), but as we wrote in the introduction our goal was not to establish a ranking.

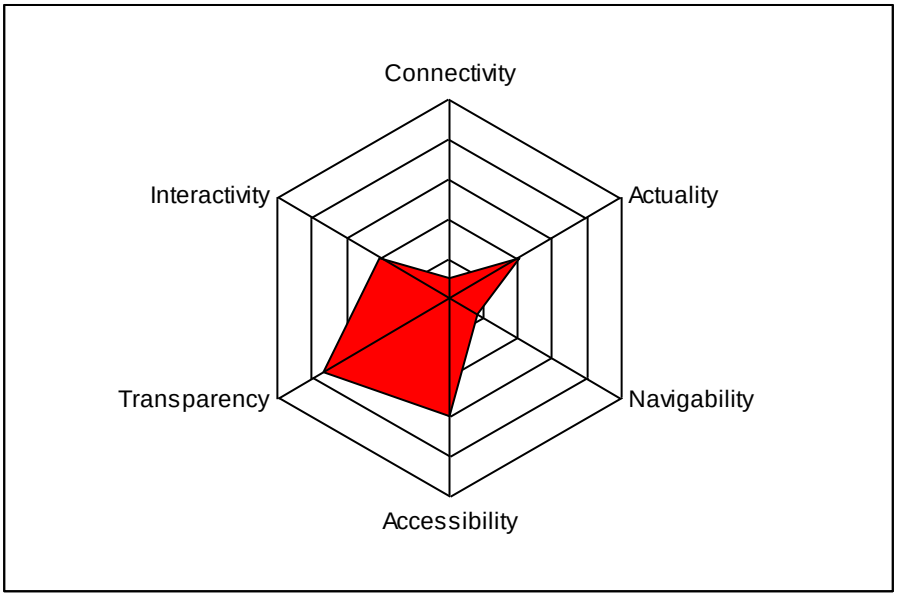

Figure 2. e-Government Proximity of Canton of Geneva Portal

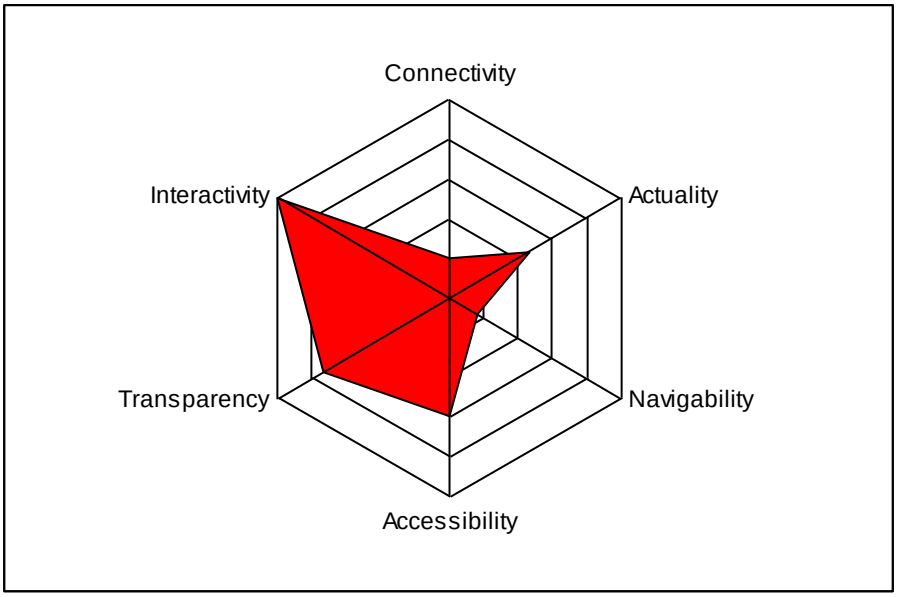

Figure 3. e-Government Proximity of Canton of Valais Portal

However this approach allowed us to make comparisons in terms of structure and balance of a Website in a synthetic graphical manner. By balance we mean that different parts of a Website and various functions of an administration should be reachable in a relatively constant numbers of clicks. Indeed we believe a balanced public portal is an indicator of the level of integration of different departments or services within one public portal. Regarding the differences between the graphs of each Canton we think they are the results of different e-Government strategies and development stages.

Our approach has its limitations: it does not take into account the numbers and variety of potential users, as it is based on the hypothesis of an average Internet user. Furthermore, the smallest number of clicks is a static concept, as we counted it once and at a given time. It does not integrate the fact that users have learning capacities and that they might have difficulties finding given information the first time they are looking for it but that they might be quicker the next time. A more complete approach, but also much more complex to realize, would be to take into account the successful and failed clicks (i.e. the ones that bring users closer to what they are looking for or the ones that do not) and to calculate a ratio. We could then compare the ratios of several successive sessions. Finally we have to say that our approach is somehow limited as it only considered Web navigation from the homepage of a Cantonal portal. However users might have bookmarks or use general search engines that will bring them to the desired point much quicker than using classical navigation, from the homepage to the different sub-sections of a portal. In other words we based our work on the idea of a one-stop governmental portal, but some users might not go through this unique entry point and rely on alternative strategies. This was particularly true in the cases of Websites built according the hierarchy of a public administration, and even more so when the different departments and sub-services were described with acronyms that the average user probably does not understand. Some sites were based on the concept of life-events, which makes it a lot easier for the users than the hierarchical approach. We however noted that this life-events model usually only covered the first layer of administrative portals: the unique entry point uses this model to direct users to a sub-section of the portal, but the next steps are so-to-say classical.

Finally, this study taught us that the realisation of an integrated and coherent interface to public services for varied users is a difficult task and that it is not yet realised in the Cantons we surveyed, although we noted an interesting progression between 2002 and 2003. We also observed that more technical aspects (navigability, actuality and connectivity) were well covered, whereas more "socio-political" aspects (data protection, access for handicapped) are not really taken into account. In our opinion this shows that e-Government must particularly progress at the organisational and socio-political level. Finally we were quite surprised to find out that so few electronic procedures were implemented and that true interactivity is yet to come in these Swiss Cantons.

To conclude this work we will add a few words on the 3-clicks rule. As we saw it emerged from the community of Web designers and became sort of a must-do. We believe that public administrations should take it into account when developing their e-Government strategies, not because all the "gurus" say so, but because many users internalised it. Thus the quality of a public portal is not only absolute, it is also based on what the citizens expect. If a portal does not meet these expectations, then it is not a usable portal.

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